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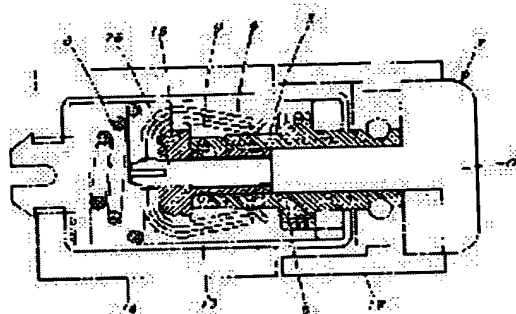
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(54) HINGE DEVICE AND ELECTRONIC APPARATUS USING HINGE DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an electronic apparatus using a hinge device forcing in an unlocking operation part and automatically rotating it even when it is a heavy opening and closing member and capable of automatically rotating and opening by weak control force even with a composition provided with a block energizing function.

SOLUTION: A holding spring body 4 energizing holding and having expansion resisting elasticity is fit on a rotating part 3 provided in a fixed state on either one of a first member or a second member and rotating along with rotation of either one. An outline of the rotating part 3 is composed so as to generate cam rotation energizing force, a rotation energizing mechanism 5 is provided energizing relative rotation in a reverse rotating direction, it is set so that the cam rotation energizing force by the holding spring body 4 is larger than relative rotation energizing force, the holding spring body 4 is composed so as to relatively move away from the rotating part 3, the unlocking operation part 7 is provided relatively moving the holding spring part 4 away from the rotating part 3, and the holding spring body 4 is separated to a position not generating the cam rotation energizing force from the rotating part 3 by an operation of the unlocking operation part 7. By this, an automatically relatively rotating composition is provided.



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CLAIMS

[Claim(s)]

[Claim 1] Are hinge equipment which pivots the part I material and the part II material, and it is prepared in this part I material or the part II material at a fixed condition. Carry out insertion arrangement of the pinching spring object which carries out pinching energization and has anti-***** in the rotation section which rotates with either rotation of this part I material and the part II material, and the shape of an appearance of said rotation section is set as the predetermined cam configuration where a path dimension changes with rotation locations. It constitutes so that the cam rotation energization force of carrying out relative rotation of said rotation section to said pinching spring object by the pinching press with said pinching spring object may arise. The rotation energization device which carries out relative rotation energization of said rotation section in the direction of inverse rotation with said cam rotation energization to said pinching spring object is established. It sets up so that the cam rotation energization force with said pinching spring object may become large rather than the relative rotation energization force by said rotation energization device. In the condition that said pinching spring object inserts in said rotation section, and said cam rotation energization force may arise. The relative rotation energization force by said rotation energization device is constituted so that relative rotation may not be carried out automatically. Said pinching spring object is relatively constituted free [estrangement migration] to said rotation section. By making it desert to the location where the lock discharge control unit which carries out estrangement migration of said this pinching spring object relatively from said rotation section is prepared, and said cam rotation energization force cannot produce said pinching spring object from said rotation section by actuation of this lock discharge control unit. Hinge equipment characterized by constituting so that said rotation section may carry out relative rotation to said pinching spring object automatically according to said rotation energization device.

[Claim 2] It is hinge equipment which can be opened and closed in the open condition which the part I material or the part II material rotated to the predetermined disconnection include angle from the state of obstruction in which pivoted the end face section comrade of the part I material and the part II material, and both sides did the polymerization.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is the thing about electronic equipment, such as a pocket type telephone and a note form personal computer, which used hinge equipment for the hinge equipment which can be opened and closed in the open condition which the part I material or the part II material rotated to the predetermined disconnection include angle, and a list from the state of obstruction in which pivoted the end face section comrade with the hinge equipment which pivots the part I material and the part II material, for example, said part I material, and the part II material, and both sides did the polymerization, for example.

[0002]

[Description of the Prior Art] For example, in the pocket type telephone as an example of a type of pocket type electronic equipment, the type is the flip type with which the flip was attached in the body of pocket type telephone free [closing motion], and really without a flip known. Although the type exceeds in respect of lightweight-izing and convenience, in points, such as the versatility of malfunction prevention of a switch, miniaturization, and a design, the flip type really exceeds.

[0003] In the pocket type electronic equipment of the type equipped with such a flip, it is requested that a flip is simply opened and closed at an one-touch ceremony.

[0004] However, since drives, such as a carbon button for canceling the rotation lock device and lock of a flip, were needed separately [hinge equipment] when conventional hinge equipment was applied to connection of the flip to the body of pocket type telephone, problems, like there is the need of components mark increasing and providing the tooth space for it had arisen.

[0005] Then, though it was the configuration which can be opened and closed by one-touch as shown in WO 00/50780 official report by which international public presentation was carried out, these people made it unnecessary to prepare the special device for a closing motion lock in a device side, and developed the hinge equipment which can be contributed to the simplification of the configuration of pocket type electronic equipment, and space-saving-ization.

[0006] With this equipment, when it applies, for example to a flip type pocket type telephone as mentioned above, the flip by which lock out energization is carried out is considering as the configuration which carries out open rotation at once automatically only by pushing with a finger the lock discharge control unit (pushing carbon button) prepared in this hinge equipment.

[0007] Although the hinge equipment which achieves this automatic closing motion function is epoch-making hinge equipment which realizes structure which carries out automatic closing motion by one-touch though a lock out energization function is achieved, the rotation energization device for carrying out automatic disconnection to this one effort shall produce the powerful energization force.

[0008] For example, torque sufficient when a flip is a thing with weight to open this is needed, and even if it can design a flip comparatively lightweight, when carrying out automatic rotation of the closing motion lid which becomes the LCD side, such as a note form personal computer, it needs quite powerful torque.

[0009] Namely, the torque spring in which it is twisted by considering as a lock out location from

an open position, for example as this rotation energization device, and the force is stored is adopted. It is adopting cam engagement structure as a lock out energization device which overcomes the automatic rotation energization force with this torque spring, preventing said rotation energization by this cam engagement, and pushing a discharge control unit (push-button). Although it is realizable by considering as the configuration which makes cam engagement of an engagement condition desert and rotates automatically one side of cam engagement by this cam engagement discharge according to said rotation energization device. When carrying out rotation energization with a torque spring powerful as mentioned above (i.e., when using a powerful torque spring so that the automatic rotation of a flip, a closing motion lid, etc. with weight can be made to carry out at once with a push-button) In order to operate the lock out energization device which resists this, when in other words not pushing a push-button yet, in order to make a state of obstruction hold, it will not become, if it comes to have prevented this strong rotation torque as powerful cam engagement. that is, one cam section of the cam engagement which carries out estrangement migration with a push-button is pressed with a powerful bearing spring, and it is necessary to steadfast-boil cam engagement and to make it hold so that cam engagement may not engage and release according to a rotation energization device freely

[0010] Since this bearing spring serves as resistance of estrangement migration of the cam section, it will have to stop however, having to push in a push-button quite strongly, if this bearing spring is made powerful.

[0011] That is, prevent automatic rotation by the closing energization by old cam engagement, make cam engagement desert with a push-button, and it is made to engage and release, and at the rotation closing-motion structure of the one-touch type which carries out open rotation automatically by this, the more the rotation energization force (rotation torque for automatic rotation) of a rotation energization device is large, the more the problem on the structure where of it is needed in the force strong to the discharge actuation with a push-button is.

[0012] This invention is what advanced research further and also solved such a trouble. When it has the automatic closing motion function to which pushing actuation is carried out and automatic disconnection of the lock discharge control unit which is the one-touch switching operation section is carried out, By the operating physical force weak also as a configuration equipped with the lock out energization function which considers as the configuration which has the strong rotation energization force in order to carry out automatic rotation of the closing motion member which has weight even if, and prevents this It aims at offering the electronic equipment which used hinge equipment for the epoch-making hinge equipment list which can carry out discharge actuation of the lock out energization which was carrying out the baffle (that is, automatic disconnection rotation can be carried out by the weak operating physical force).

[0013]

[Means for Solving the Problem] The summary of this invention is explained with reference to an accompanying drawing.

[0014] Are hinge equipment which pivots the part I material 1 and the part II material 2, and it is prepared at a fixed condition in this part I material 1 or the part II material 2. In the rotation section 3 which rotates with either rotation of this part I material 1 and the part II material 2 Carry out insertion arrangement of the pinching spring object 4 which carries out pinching energization and has anti-*****, and the shape of an appearance of said rotation section 3 is set as the predetermined cam configuration where a path dimension changes with rotation locations. It constitutes so that the cam rotation energization force of carrying out relative rotation of said rotation section 3 to said pinching spring object 4 by the pinching press with said pinching spring object 4 may arise. The rotation energization device 5 which carries out relative rotation energization of said rotation section 3 in the direction of inverse rotation with said cam rotation energization to said pinching spring object 4 is established. It sets up so that the cam rotation energization force with said pinching spring object 4 may become large rather than the relative rotation energization force by said rotation energization device 5. In the condition that said pinching spring object 4 inserts in said rotation section 3, and said cam rotation energization force may arise The relative rotation energization force by said rotation energization device 5 is

constituted so that relative rotation may not be carried out automatically. Said pinching spring object 4 is relatively constituted free [estrangement migration] to said rotation section 3. The lock discharge control unit 7 which carries out estrangement migration of said this pinching spring object 4 relatively from said rotation section 3 is formed. By making it desert to the location where said cam rotation energization force cannot produce said pinching spring object 4 from said rotation section 3 by actuation of this lock discharge control unit 7 The hinge equipment characterized by constituting so that said rotation section 3 may carry out relative rotation to said pinching spring object 4 automatically according to said rotation energization device 5 is started.

[0015] Moreover, it is hinge equipment which can be opened and closed in the open condition which the part I material 1 or the part II material 2 rotated to the predetermined disconnection include angle from the state of obstruction in which pivoted the end face section comrade of the part I material 1 and the part II material 2, and both sides did the polymerization. The rotation section 3 which is prepared at a fixed condition in said part I material 1 or the part II material 2, and rotates with either rotation of this part I material 1 and the part II material 2, It is prepared in any of said part I material 1 and the part II material 2, or another side at a fixed condition. The pinching spring object 4 which rotates with any of this part I material 1 and the part II material 2 or rotation of another side is established. Carry out insertion arrangement of said pinching spring object 4 which presses said rotation section 3 by pinching energization, and has anti-***** at this rotation section 3, and the shape of an appearance of said rotation section 3 is set as the predetermined cam configuration where a path dimension changes with rotation locations. Carry out relative rotation of said rotation section 3 to said pinching spring object 4 by the pinching press with said pinching spring object 4, and it constitutes so that the cam rotation energization force closed and energized to a state of obstruction may arise. The rotation energization device 5 which carries out relative rotation energization of said rotation section 3 in the direction of inverse rotation with said cam rotation energization to said pinching spring object 4 is established. It sets up so that the direction of the cam rotation energization force it is weak to the closing energization with said pinching spring object 4 from the relative rotation energization force it is weak to the aperture energization to the open condition by said rotation energization device 5 may become large. In the condition that the cam rotation energization force said pinching spring object 4 inserts in said rotation section 3, and it is weak to said closing energization with this pinching spring object 4 arises Depending on the relative rotation energization force it is weak to the aperture energization by said rotation energization device 5, relative rotation is not carried out automatically. Constitute so that a state of obstruction may be held, and said pinching spring object 4 is relatively constituted free [estrangement migration] to said rotation section 3. The lock discharge control unit 7 which carries out estrangement migration of said pinching spring object 4 relatively from said rotation section 3 is formed. By making it desert to the location where said cam rotation energization force cannot produce said pinching spring object 4 from said rotation section 3 by actuation of this lock discharge control unit 7 The hinge equipment according to claim 1 characterized by constituting so that relative rotation may be automatically carried out in the direction which said rotation section 3 makes an open condition to said pinching spring object 4 according to said rotation energization device 5 is started.

[0016] Moreover, said pinching spring object 4 is applied to hinge equipment given in any 1 term of claims 1 and 2 characterized by constituting with the support-from-under form spring which has the opposite section of the pair which presses said rotation section 3 by pinching energization.

[0017] Moreover, the support-from-under form flat spring which has opposite Itabe of the pair which presses said rotation section 3 to pinch constitutes said pinching spring object 4. The Rth page or inclined plane which produces the cam rotation force as the cam configuration section is formed in a part of configuration or rotation section 3 so that said cam rotation energization force the rotation posture in which the outer-diameter dimension of the rotation section 3 becomes small by this opposite Itabe's pinching press is made to rotate may arise. The hinge equipment according to claim 3 characterized by constituting from carrying out the pinching

press of this cam configuration section so that said cam rotation energization force may arise is started.

[0018] Moreover, said pinching spring object 4 considers as the configuration which carried out two or more sheet polymerization of the support-from-under form flat spring which has opposite ltabe of the pair which presses said rotation section 3 to pinch, and it starts having constituted so that it might be generated in said cam rotation energization force by the pinching energization which excels from the relative rotation energization force by said rotation energization device 5 to the hinge equipment according to claim 4 carry out as the description.

[0019] Moreover, said pinching spring object 4 forms successively the guide sections 9 which guide resisting and carrying out estrangement migration to the tip side of said rotation section 3 at the bearing elastic section 8. In the rotation location in the middle of said rotation section 3 carrying out relative rotation automatically to said pinching spring object 4 according to said rotation energization device 5 Said pinching spring object 4 which deserted the location which pinches said guide section 9 In the predetermined rotation location which returned to the engagement location which this pinching spring object 4 and said rotation section 3 insert in, and could not **, but ended the automatic relative rotation by the rotation energization device 5 and which or will be ended [rotation] The pinching spring object 4 is applied to hinge equipment given in any 1 term of claims 1-5 characterized by setting said guide section 9 as the configuration which it returns to said engagement location automatically according to the return force of said bearing elastic section 8, and **, and said automatic relative rotation ends.

[0020] Moreover, it starts having prepared the maintenance engagement section 11 which engages with the guide object 9 which guides estrangement migration of the pinching spring object 4 which formed successively to the point of said rotation section 3 or the rotation section 3 at the engagement section 10 holding the rotation location which the automatic relative rotation to said pinching spring object 4 of said rotation section 3 by said rotation energization device 5 ends to the hinge equipment of the publication by any 1 term of claims 1-6 carry out as the description.

[0021] Moreover, said lock discharge control unit 7 starts hinge equipment given in any 1 term of claims 1-7 characterized by constituting from actuation rod part 7B which the bearing elastic section 8 is resisted [B] and carries out push estrangement of said pinching spring object 4 from said rotation section 3 by push control unit 7A and this push control unit 7A.

[0022] Moreover, the electronic equipment using the hinge equipment characterized by forming the hinge equipment indicated in any 1 term of said claims 1-8 in the pivoting section is started.

[0023] [Embodiment of the Invention] The operation effectiveness is shown based on a drawing, and the gestalt (how does it invent?) of operation of this invention it is considered that is suitable is explained briefly.

[0024] When rotation energization of the pinching spring object 4 is carried out by the rotation energization device 5 to the rotation section 3, in the condition that the rotation section 3 and the pinching spring object 4 are carrying out insertion engagement, a baffle is carried out because the pinching spring object 4 carries out pinching press in the rotation section 3 of a predetermined cam configuration, and the pinching spring object 4 does not carry out automatic rotation to the rotation section 3 depending on this rotation energization device 5.

[0025] Moreover, if, on the other hand, operate the lock discharge control unit 7, for example, the pinching spring object 4 is made to desert to the rotation section 3 and the baffle condition by pinching press of said pinching spring object 4 is canceled, the pinching spring object 4 will rotate automatically to the rotation section 3 according to said rotation energization device 5. That is, when the lock discharge control unit 7 is operated, the part I material 1 or the part II material 2 will rotate automatically to another side.

[0026] Therefore, having the function which carries out automatic rotation by actuation of the lock discharge control unit 7 This automatic rotation is prevented by insertion engagement on the rotation section 3 and the pinching spring object 4. Can constitute so that the cam rotation energization force may arise in the reverse rotation direction with the cam configuration of the rotation section 3, and moreover and the baffle force which prevents the automatic rotation by

this rotation energization device 5 In order to make it generated according to said cam rotation energization force with the cam configuration of this rotation section 3, and the pinching spring object 4 which presses this, when the automatic rotation energization force of the rotation energization device 5 is strengthened Since it becomes the configuration which should just strengthen pinching energization of the pinching spring object 4, even if it has the bearing elastic section 8 which supports insertion engagement on the rotation section 3 and the pinching spring object 4, it is not necessary to strengthen this bearing elastic section 8. The operating physical force of the lock discharge control unit 7 which this bearing elastic section 8 is resisted [control unit] and makes the pinching spring object 4 desert the rotation section 3 serves as a configuration which is weak and ends.

[0027] From the state of obstruction in which pivoted the end face section comrade of the part I material 1 and the part II material 2, and both sides did the polymerization For example, this invention is applied to the hinge equipment which can open and close the part II material 2 in the open condition rotated to the predetermined disconnection include angle to the part I material 1. For example, the rotation section 3 is formed in a fixed condition (baffle condition) to the part I material 1. While forming the pinching spring object 4 in a fixed condition (baffle condition) to the part II material 2 which carries out open rotation and carrying out rotation energization of this pinching spring object 4 in the open direction according to the rotation energization device 5 This pinching spring object 4 is inserted in the rotation section 3 made into the predetermined cam configuration that the automatic rotation by the rotation energization device 5 of this pinching spring object 4 should be prevented. the pinching press with this pinching spring object 4 — or, if it constitutes so that the cam rotation energization force stronger than automatic rotation energization of said rotation energization device 5 may arise by the pinching press of the pinching spring object 4 to rotation of the rotation section 3 Automatic rotation of said pinching spring object 4 is prevented by the cam rotation energization force to the direction of closing with this pinching spring object 4.

[0028] In the state of obstruction in which followed, for example, the part I material 1 and the part II material 2 carried out the polymerization The rotation section 3 and the pinching spring object 4 carry out insertion engagement, and a baffle (eye a blade latch) is carried out by the cam rotation energization force with this pinching spring object 4. Further or depending on the cam configuration of the rotation section 3, and a setup of pinching press of the pinching spring object 4 By closing according to the cam rotation energization force still more, and it being energized in a state of obstruction, and operating the lock discharge control unit 7 If the pinching spring object 4 is made to desert the rotation section 3, it is canceled and the pinching spring object 4 rotates automatically according to the rotation energization device 5, for example, automatically, at once, the part II material 2 carries out open rotation to the part I material 1, and the cam rotation energization force which was being committed in said direction of closing will be in an open condition.

[0029] What is necessary is just to adopt the pinching spring object 4 which it has in strong pinching energization (strong anti-*****) so that it may be generated in the strong cam rotation energization force which resists this in this case, although it is necessary to constitute since it follows, for example, there is weight of this part II material 2 so that the strong cam rotation energization force (baffle holding power) which resists this may arise when a strong spring constitutes the rotation energization force of the rotation energization device 5. Therefore, even if it forms the bearing elastic section 8 which supports insertion engagement on the rotation section 3 and the pinching spring object 4, for example, the push operating physical force which this bearing elastic section 8 does not have to consider [operating physical force] as a strong spring according to the reinforcement of the rotation energization force, therefore the pinching spring object 4 of the lock discharge control unit 7 is pushed [operating physical force], and makes the pinching spring object 4 desert may be weak.

[0030]

[Example] The concrete example of this invention is explained based on a drawing.

[0031] By this example, the end face section comrade of the part I material 1 and the part II material 2 is pivoted, and both sides are what applied this invention to the hinge equipment of

the electronic equipment the part II material 2 can be opened from the state of obstruction which carried out the polymerization and closed in the open condition to a predetermined disconnection include angle to the part I material 1, and explain below.

[0032] The rotation section 3 is formed in a fixed condition at the part I material 1 (this example body section), and if the part I material 1 is rotated, in connection with this, the rotation section 3 is constituted so that it may rotate.

[0033] Since the part I material 1 is considering as the body section, this rotation section 3 of this example is the part which can also be said to be the fixed shaft of hinge equipment. In addition, it becomes a revolving shaft in rotating the part I material 1 conversely.

[0034] Moreover, if the pinching spring object 4 is formed in a fixed condition (baffle condition) at the part II material 2 (this example closing motion member) and open rotation of the part II material 2 is carried out to the part I material 1, it constitutes so that the pinching spring object 4 may rotate to said rotation section 3 with rotation of this part II material 2.

[0035] That is, the rotation section 3 is connected with the part I material 1 through the attachment section 12, projects to the shaft orientations within the case 13 of hinge equipment, is prepared in a condition, and is united with the part I material 1.

[0036] Moreover, the pinching spring object 4 resists shaft orientations in this case 13 at the elastic bearing section 8, and is constituted free [slide migration] while being arranged through the attachment section 14 in said case 13 by which baffle connection is carried out at the part II material 2, being prepared in a baffle condition with the bearing elastic section 8 to this case 13, and being prepared so that it may rotate the whole case 13 with rotation of the part II material 2.

[0037] Furthermore, if it explains, the pinching spring object 4 is arranged in the rotation section 3 by the insertion condition, resists the elastic bearing section 8, and consists of the rotation sections 3 free [estrangement slide migration]. In addition, in case the pinching spring object 4 deserts, pushes and contracts the elastic bearing section 8 of this example, it adopts the spiral spring which becomes flat [-like], and it is attaining space-saving-ization.

[0038] Moreover, in this example, the rotation energization device 5 for making the automatic rotation of the part II material 2 change into an open condition is established.

[0039] That is, it can twist by making the part II material 2 into a state of obstruction from an open condition, the force is conserved, and the torque spring 5 which the automatic rotation energization force produces in the direction of an aperture is formed in a case 13, and it constitutes from this example so that rotation energization of the pinching spring object 4 may be carried out in the direction of an aperture to the rotation section 3.

[0040] Moreover, the shape of an appearance of the rotation section 3 is made into a predetermined cam configuration, and said pinching spring object 4 consists of considering as the support-from-under form spring which carries out pinching energization and has anti-*****, inserting this pinching spring object 4 in the rotation section 3, and carrying out pinching press so that the cam rotation energization force may arise in the direction of closing.

[0041] That is, it constitutes so that the rotation section 3 may prevent in the direction of an aperture by the cam rotation energization force produced in the direction of closing by carrying out the pinching press of what it is going to do for automatic rotation with the pinching spring object 4 which has this anti-***** (preventing by insertion engagement on the rotation section 3 and the pinching spring object 4) and the automatic rotation by said rotation energization device 5 may be prevented.

[0042] Moreover, constitute the pinching spring object 4 free [estrangement migration] to the rotation section 3, and the lock discharge control unit 7 which carries out estrangement migration of the pinching spring object 4 from the rotation section 3 is formed. It constitutes so that the pinching spring object 4 may rotate automatically according to said rotation energization device 5 and it may be in an open condition by making it desert to the location which resists said bearing elastic section 8 in the pinching spring object 4 by actuation of this lock discharge control unit 7, and said cam rotation energization force cannot produce from the rotation section 3.

[0043] Moreover, at this example, this lock discharge control unit 7 consists of actuation rod

part 7B which the bearing elastic section 8 is resisted [B] and carries out push estrangement of the pinching spring object 4 from said rotation section 3 by push control unit 7A used as a push-button, and this push control unit 7A.

[0044] This push control unit 7A considers as the configuration projected outside from one flank of a case 13, and actuation rod part 7B penetrates the inside of said rotation section 3, is connected with the actuation lever connection section 15 inside the pinching spring object 4, and it is constituted so that the pinching spring object 4 may be made to desert the rotation section 3 by the push operation of push control unit 7A (push-button).

[0045] That is, this pinching spring object 4 is inserted in the rotation section 3 made into the predetermined cam configuration. Or it constitutes so that the cam rotation energization force stronger than automatic rotation energization of said rotation energization device 5 may arise by the pinching press of the pinching spring object 4 to rotation of the rotation section 3. the pinching press with this pinching spring object 4 — It constitutes so that automatic rotation of said pinching spring object 4 may be prevented by the cam rotation energization force to the direction of closing with this pinching spring object 4.

[0046] Therefore, it sets to the state of obstruction in which the part I material 1 and the part II material 2 carried out the polymerization. The rotation section 3 and the pinching spring object 4 carry out insertion engagement, and a baffle (eye a blade latch) is carried out by the cam rotation energization force produced in what the pinching spring object 4 tends to rotate by pinching press of this pinching spring object 4. Furthermore, a setup of pinching press of the cam configuration of the rotation section 3, and the pinching spring object 4 in this example, That is, it constitutes so that the condition of there being [in / constitute so that it may close / in / are the posture which the rotation section 3 still rotated for a while also by the state of obstruction, and / a state of obstruction / according to the cam rotation energization force still more and may be energized, and / a state of obstruction] nothing also with backlash, and having closed without the clearance can be realized easily.

[0047] And if the pinching spring object 4 is made to desert the rotation section 3 by carrying out push actuation of the lock discharge control unit 7, the cam rotation energization force which was being committed in said direction of closing is canceled, and the pinching spring object 4 rotates automatically according to the rotation energization device 5, and it constitutes so that the part II material 2 may carry out open rotation automatically to the part I material 1 and it may be in an open condition.

[0048] Although it is necessary to constitute since it follows, for example, there is weight of this part II material 2 so that the strong cam rotation energization force (baffle holding power) which resists this may arise when a strong spring constitutes the rotation energization force of the rotation energization device 5 (for example, the number of turns of the torque spring 5 are increased) In this case, in order for what is necessary to be just to adopt the pinching spring object 4 which has strong pinching energization (strong anti-*****) so that the strong cam rotation energization force which resists this may arise, The push operating physical force which the bearing elastic section 8 which supports insertion engagement on the rotation section 3 and the pinching spring object 4 does not have to consider [operating physical force] as a strong spring according to the reinforcement of the rotation energization force, therefore the pinching spring object 4 of the lock discharge control unit 7 is pushed [operating physical force], and makes the pinching spring object 4 desert may be weak.

[0049] Moreover, the support-from-under form flat spring which has opposite Itabe of the pair which carries out the pinching press of said rotation section 3 for the pinching spring object 4 constitutes from this example, and it constitutes so that it may be generated in said cam rotation energization force of making the rotation posture in which the outer-diameter dimension of the rotation section 3 becomes small by this opposite Itabe's pinching press rotating the rotation section 3.

[0050] The condition, i.e., the condition of pinching the both sides of the minor-axis section of the rotation section 3, that the pinching spring object 4 is carrying out insertion engagement of the rotation posture to which the path dimension of the rotation section 3 became small, by therefore, the thing to consider as a state of obstruction Although the force which is going to

extend the pinching spring object 4 will work since a part longer than the minor-axis section will be pinched if it is going to rotate in the direction which the rotation section 3 opens by insertion engagement of this pinching spring object 4. It will close by the force stronger against the direction of return (the direction of closing) than this, energization (cam rotation energization force) will arise, therefore the automatic rotation by the rotation energization device 5 will be prevented by the anti-***** of the pinching spring object 4, and a state of obstruction will be held.

[0051] Moreover, in case the part II material 2 is rotated in the open direction irrespective of the rotation energization device 5 by hand in the condition [that do not carry out push actuation of the lock discharge control unit 7, but the rotation section 3 and the pinching spring object 4 have carried out insertion engagement], if it is generated by the pinching press with this pinching spring object 4 in the cam rotation energization force (closing energization) to the direction of closing and a hand is detached, it will return to a state of obstruction by this closing energization automatically. Moreover, if a cam configuration is set up so that it may close by carrying out predetermined include-angle rotation and energization may decrease, this serves as rotation resistance and the fleece top condition of stopping at the location which lifted the hand can be realized easily.

[0052] In other words, moreover, by pinching energization of the pinching spring object 4, and setup of the cam configuration of the rotation object 3. If closing energization (cam rotation energization force) is set up greatly, and it can also constitute so that it may close and rotate to a state of obstruction again if a hand is lifted as mentioned above and will rotate more than a predetermined disconnection include angle by hand. Even if the cam rotation energization force becomes weak, or it becomes there is not less and it lifts a hand according to the rotation energization device 5, it can constitute so that open rotation may be automatically carried out to an open condition.

[0053] By considering as the cam configuration of a rectangular mold of having the minor-axis section and the major-axis section, in this example, and rotating by the 90 degree hand. In order to cross the location which pinches the major-axis section, and not to exceed the major-axis section if it constitutes so that automatic rotation may be carried out to an open condition according to the rotation energization device 5, and it is not made to rotate by hand to 90 degree even if it releases its hand. Return rotation is carried out according to the cam rotation energization force to the state of obstruction of the posture which pinches the both sides of the minor-axis section again, and it constitutes so that a state of obstruction may be held.

[0054] Therefore, it constitutes from this example so that it may close to the location rotated 90 degree and energization may work.

[0055] Moreover, it considers as the configuration which carries out the pinching press of the rotation section 3 with the pinching spring object 4 with the posture which inclined a little in this example from the posture which pinches the minor-axis section also in a state of obstruction. It constitutes, as closing energization (cam rotation energization force) has arisen still more in the state of obstruction, and the state of obstruction is considering as the configuration which can be easily designed so that a clearance unnecessary between the part I material 1 and the part II material 2 etc. may not be generated at the time of backlash, **, and lock out.

[0056] Moreover, in the posture which pinches the minor-axis section of the rotation section 3, a side edge is cut, a corner is considered as the configuration which carries out pinching press with the pinching spring object 4, and it lessens with [in an open condition and a state of obstruction] backlash.

[0057] Moreover, the pinching spring object 4 is considered as the configuration which carried out two or more sheet polymerization of the support-from-under form flat spring which has opposite [tabe of the pair which presses the rotation section 3, and it constitutes so that said cam rotation energization force by the pinching energization which excels from the rotation energization force by said rotation energization device 5 may be acquired simply.

[0058] Moreover, said pinching spring object 4 forms successively the tubed guide sections 9 which guide resisting and carrying out estrangement migration to the tip side of the rotation

section 3 at the bearing elastic section 8. In the rotation location in the middle of the pinching spring object 4 rotating automatically according to said rotation energization device 5 Said pinching spring object 4 which deserted the location which pinches said guide section 9 Since the outer diameter of the rotation section 3 is larger than the guide section 9 (the rotation section 3 is path size from the guide section 9) In the rotation location which will return to the engagement location which the pinching spring object 4 and the rotation section 3 insert in, and cannot **, but will end the automatic rotation by the rotation energization device 5 The outer diameter of the guide section 9 and the outer diameter of the rotation section 3 carried out abbreviation coincidence, and the pinching spring object 4 has set said guide section 9 as the configuration which it returns to said engagement location automatically according to the return force of said bearing elastic section 8, and **, and said automatic rotation ends.

[0059] The outer diameter of the guide section 9 by namely, the thing to consider as the configuration which is mostly in agreement with the minor-axis section of the rotation section 3 Since it is in the condition that the pinching spring object 4 is pinching the both sides of the minor-axis section in the state of obstruction, If the bearing elastic section 8 of a weak return spring is resisted from this rotation section 3 to the guide section 9, estrangement migration is smoothly carried out by actuation of the lock discharge control unit 7 and the pinching spring object 4 begins automatic rotation according to the rotation energization device 5 Even if the return force of the bearing elastic section 8 is working, the rotation section 3 returns from the guide section 9 for path size, and does not **. It constitutes so that may return to the rotation section 3 by considering the guide section 9 as a guide according to the return force of the bearing elastic section 8 automatically as long as the lock discharge control unit 7 will continue being pushed, if it rotates 180 abbreviation and becomes the location of the minor-axis section again, and it may **, the pinching spring object 4 may insert in the rotation section 3 and baffle maintenance may be carried out again.

[0060] Moreover, in this example, it is considering as the configuration which formed the maintenance engagement section 11 which engages with the engagement section 10 holding the rotation location which the automatic rotation to said pinching spring object 4 of the rotation section 3 by said rotation energization device 5 ends as shown in the point of this guide object 9 at drawing 6 and drawing 7.

[0061] Form this engagement section 10 in said actuation lever connection section 15, and the lock discharge control unit 7 in the condition of not carrying out push actuation If it is engaged when located in a state of obstruction and an open condition, it will have been ridden by this engagement and it will engage and release, if closing energization of the pinching spring object 4 is resisted and the part II material 2 is rotated by hand, and push actuation of the lock discharge control unit 7 is carried out It constitutes so that estrangement engaging and releasing may be carried out because the actuation lever connection section 15 also deserts with the pinching spring object 4.

[0062] Moreover, although the rotation section 3 was only made into the shape of a rectangle as mentioned above and being considered as the configuration rotated to the posture which rotates 180 abbreviation from the posture which pinches the direction of a minor axis, and pinches the direction of a minor axis again in this example Although the posture will be closed and carried out in this until it rotates 90 abbreviation exceeding the posture which pinches the major-axis section as mentioned above For example, if relative rotation of the shape of an appearance of the rotation section 3 is carried out for a while to the pinching spring object 4 as shown in drawing 8, the cam rotation energization force of the automatic rotation energization to the open direction of the rotation energization device 5 and the same direction will arise conversely by pinching press of the pinching spring object 4. Even if the rest lifts a hand, may constitute it only from carrying out release rotation of the part II material 2 by hand for a while so that automatic disconnection rotation may be carried out according to the cam rotation energization force of this direction which promotes the rotation energization device 5, and Moreover, if the cam rotation energization force is canceled only by constituting as shown in drawing 9 - drawing 11, and rotating for a while, only friction by the pinching press with the pinching spring object 4 serves as rotation resistance and the rotation energization force of the rotation energization

device 5 is set up greatly The configuration which carries out open rotation automatically is realizable at once as the part II material 2 is rotated for a while by hand, even if it does not carry out push actuation of the lock discharge control unit 7.

[0063] That is, if the cam engagement section 16 engaged in a state of obstruction and an open condition tends to be formed in the rotation section 3 and the pinching spring object 4 and this cam engagement on this rotation section 3 and the pinching spring object 4 tends to separate, it constitutes so that the cam rotation energization force may arise. Namely, as shown, for example in drawing 9, cam crevice 16A is formed in the periphery of the rotation section 3. Bending formation of the cam heights 16B which engages with this cam crevice 16A is carried out at the pinching spring object 4. Or as shown in drawing 10, form cam heights 16B in the rotation section 3, and cam crevice 16A with which this cam heights 16B engages is formed as a slotted hole which cut the pinching spring object 4. If maintenance of a state of obstruction and an open condition tends to be attained and it is going to separate from this cam engagement by cam engagement by this cam irregularity, the return force which tends to be engaged will arise and this return cam force will be produced as said cam rotation energization force.

[0064] Therefore, in the rotation location near a state of obstruction or this, although the rotation range which closing energization commits is narrow in this case since the inclined plane of this cam crevice 16A can be made rapid, although the force in which cam heights 16B tends to fall in this cam crevice 16A works as cam rotation energization force (closing energization force), it becomes easy to constitute so that big closing energization may be produced.

[0065] Moreover, carrying out automatic disconnection rotation can also be easily designed because a setup becomes broadly possible and only a few carries out open rotation of the fleece top condition as mentioned above.

[0066] Moreover, as shown in drawing 11, the pinching spring object 4 is constituted from a U character-like wire rod, this wire rod itself is set to said cam heights 16B, and even if it forms in the periphery of the rotation section 3 cam crevice 16A with which this wire rod engages, a design in various specifications as mentioned above is attained.

[0067] In addition, this invention is not restricted to this example and the concrete configuration of each requirement for a configuration can be designed suitably.

[0068] A concrete configuration changes by whether actuation of the rotation section 3 and the pinching spring object 4 should just have relative relation, and the rotating side is made into either.

[0069]

[Effect of the Invention] Since this invention was constituted as mentioned above, when it has the automatic closing motion function to which automatic disconnection of the lock discharge control unit which is the one-touch switching operation section is operated and carried out, By the operating physical force weak also as a configuration equipped with the lock out energization function which considers as the configuration which has the strong rotation energization force in order to carry out automatic rotation of the closing motion member which has weight even if, and prevents this It becomes electronic equipment which used hinge equipment for the epoch-making hinge equipment list which can carry out discharge actuation of the lock out energization which was carrying out the baffle (that is, automatic disconnection rotation can be carried out by the weak operating physical force).

[0070] Namely, although it is necessary to constitute since there is weight of the part I material which carries out automatic rotation, for example, or the part II material so that the strong cam rotation energization force (baffle holding power) which resists this may arise when a strong spring constitutes the rotation energization force of a rotation energization device In this case, since it becomes the configuration which should just adopt the pinching spring object which has strong pinching energization (strong anti-*****) so that the strong cam rotation energization force which resists this may arise Even if it prepares the bearing elastic section which supports insertion engagement on the rotation section and a pinching spring object, for example, this bearing elastic section The push operating physical force which it is not necessary to consider [operating physical force] as a strong spring according to the reinforcement of the rotation energization force, therefore the pinching spring object of a lock discharge control unit is pushed

[operating physical force], and makes a pinching spring object desert serves as electronic equipment which used hinge equipment for the hinge equipment list which exceeded in practicality extremely, such as it being weak and exceeding in operability.

[0071] Moreover, in invention according to claim 2, an operation and effectiveness of this invention serve as hinge equipment which is invented much more good and which exceeded extremely.

[0072] Moreover, in invention of claims 3 and 4 and five publications, it becomes hinge equipment which can realize this invention still more easily and which exceeded in practicality extremely.

[0073] Moreover, it becomes epoch-making hinge equipment which the design also of returning to the location which a pinching spring inserts [in / automatically moreover / in invention according to claim 6, estrangement / of a pinching spring / moving becomes smooth, and said operation and effectiveness are demonstrated certainly, and / a state-of-obstruction and disconnection condition] in the rotation section, and also making it ** was attained easily, and exceeded in operability further.

[0074] Moreover, in invention according to claim 7, it becomes hinge equipment which an open condition is held and exceeds in practicality further.

[0075] Moreover, in invention according to claim 9, it becomes electronic equipment using the excellent hinge equipment which demonstrates said operation and effectiveness.

[Translation done.]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanation perspective view of this example.

[Drawing 2] It is an explanation sectional view in the state of obstruction of this example.

[Drawing 3] The lock discharge control unit of this example is pushed, and it is an explanation sectional view in the middle of automatic disconnection rotation.

[Drawing 4] It is the decomposition explanation perspective view of this example.

[Drawing 5] It is the explanatory view showing the relation between the rotation section in an open condition, and a pinching spring object in the middle of the state of obstruction of this example, and rotation.

[Drawing 6] It is the explanation decomposition perspective view showing engagement in the maintenance engagement section prepared in the guide section of the rotation section of this example, and the engagement section prepared in the actuation lever connection section.

[Drawing 7] They are the explanatory view of the engagement condition in the state of obstruction and the open condition that the maintenance engagement section prepared in the guide section of the rotation section of this example and the engagement section prepared in the actuation lever connection section are being engaged, and the explanatory view, in which being in the middle of rotation and showing the condition of carrying out estrangement engaging and releasing.

[Drawing 8] It is the case where the part II material is rotated by hand, without carrying out push actuation of the lock discharge control unit of this example, and is the explanatory view in which showing example 1 of another of the cam configuration of the rotation section, and showing the relation between the rotation section in an open condition, and a pinching spring object in the middle of a state of obstruction and rotation.

[Drawing 9] It is the explanatory view showing example 2 of another of the cam configuration of the rotation section (pinching spring object) of this example.

[Drawing 10]

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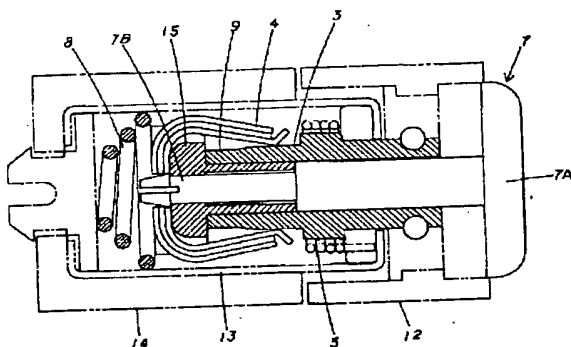
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(54) 【発明の名称】 ヒンジ装置並びにヒンジ装置を用いた電子機器

(57) 【要約】 (修正有)

【課題】 重量のある開閉部材でもロック解除操作部を押込操作して自動回動させ、閉塞付勢機能を備えた構成としても、弱い操作力で自動開放回動できるヒンジ装置を用いた電子機器。

【解決手段】 第一部材、第二部材のいずれか一方に固定状態に設けられ、いずれか一方の回動に伴って回動する回動部3に、挟持付勢し抗撓弾性を有する挟持バネ体4を被嵌配設し、回動部3の外形状をカム回動付勢力が生じるように構成し、逆回転方向に相対回動付勢する回動付勢機構5を設け、相対回動付勢力よりも挟持バネ体4によるカム回動付勢力の方が大きくなるように設定して、挟持バネ体4を回動部3に対して相対的に離反移動自在に構成し、この挟持バネ体4を回動部3から相対的に離反移動させるロック解除操作部7を設け、この操作により挟持バネ体4を回動部3からカム回動付勢力が生じ得ない位置まで離反させることで、自動的に相対回動するように構成する。



【特許請求の範囲】

【請求項1】 第一部材、第二部材とを枢着するヒンジ装置であって、この第一部材、第二部材のいずれか一方に固定状態に設けられ、この第一部材、第二部材のいずれか一方の回転に伴って回転する回転部に、挟持付勢し抗撓弾性を有する挟持バネ体を被嵌配設し、前記回転部の外形状を回転位置によって径寸法が異なる所定のカム形状に設定して、前記挟持バネ体による挟持押圧により前記回転部を前記挟持バネ体に対して相対回転させるカム回転付勢力が生じるように構成し、前記回転部を前記挟持バネ体に対して前記カム回転付勢とは逆回転方向に相対回転付勢する回転付勢機構を設け、前記回転付勢機構による相対回転付勢力よりも前記挟持バネ体によるカム回転付勢力の方が大きくなるように設定して、前記回転部に前記挟持バネ体が被嵌し前記カム回転付勢力が生じ得る状態においては、前記回転付勢機構による相対回転付勢力よりは自動的に相対回転しないように構成し、前記挟持バネ体を前記回転部に対して相対的に離反移動自在に構成し、この前記挟持バネ体を前記回転部から相対的に離反移動させるロック解除操作部を設け、このロック解除操作部の操作により前記挟持バネ体を前記回転部から前記カム回転付勢力が生じ得ない位置まで離反させることで、前記回転付勢機構により前記回転部が自動的に前記挟持バネ体に対して相対回転するように構成したことを特徴とするヒンジ装置。

【請求項2】 第一部材と第二部材との基端部同志を枢着して、双方が重合した閉塞状態から第一部材、第二部材のいずれか一方が所定開放角度まで回転した開放状態に開閉できるヒンジ装置であって、前記第一部材、第二部材のいずれか一方に固定状態に設けられ、この第一部材、第二部材のいずれか一方の回転に伴って回転する回転部と、前記第一部材、第二部材のいずれか他方に固定状態に設けられ、この第一部材、第二部材のいずれか他方の回転に伴って回転する挟持バネ体とを設け、前記回転部を挟持付勢により押圧し抗撓弾性を有する前記挟持バネ体をこの回転部に被嵌配設し、前記回転部の外形状を回転位置によって径寸法が異なる所定のカム形状に設定して、前記挟持バネ体による挟持押圧により前記回転部を前記挟持バネ体に対して相対回転させて閉塞状態へ閉じ付勢するカム回転付勢力が生じるように構成し、前記回転部を前記挟持バネ体に対して前記カム回転付勢とは逆回転方向に相対回転付勢する回転付勢機構を設け、前記回転付勢機構による開放状態への開き付勢となる相対回転付勢力よりも前記挟持バネ体による閉じ付勢となるカム回転付勢力の方が大きくなるように設定して、前記回転部に前記挟持バネ体が被嵌しこの挟持バネ体により前記閉じ付勢となるカム回転付勢力が生じる状態においては、前記回転付勢機構による開き付勢となる相対回転付勢力によっては自動的に相対回転せず、閉塞状態が保持されるように構成し、前記挟持バネ体を前記回転部

に対して相対的に離反移動自在に構成し、前記挟持バネ体を前記回転部から相対的に離反移動させるロック解除操作部を設け、このロック解除操作部の操作により前記挟持バネ体を前記回転部から前記カム回転付勢力が生じ得ない位置まで離反させることで、前記回転付勢機構により前記回転部が前記挟持バネ体に対して開放状態とする方向へ自動的に相対回転するように構成したことを特徴とする請求項1記載のヒンジ装置。

【請求項3】 前記挟持バネ体は、前記回転部を挟持付勢により押圧する一対の対向部を有する抱持形バネにより構成したことを特徴とする請求項1、2のいずれか1項に記載のヒンジ装置。

【請求項4】 前記挟持バネ体は、挟持する前記回転部を押圧する一対の対向板部を有する抱持形板バネにより構成し、この対向板部の挟持押圧により回転部の外径寸法が小さくなる回転姿勢に回転せしめる前記カム回転付勢力が生じるように構成又は回転部の一部にカム形状部としてカム回動力を生じるR面若しくは傾斜面を形成し、このカム形状部を挟持押圧することで、前記カム回動力付勢力が生じるように構成したことを特徴とする請求項3記載のヒンジ装置。

【請求項5】 前記挟持バネ体は、挟持する前記回転部を押圧する一対の対向板部を有する抱持形板バネを複数枚重合した構成として、前記回転付勢機構による相対回転付勢力より勝る挟持付勢による前記カム回転付勢力が生じ得るように構成したことを特徴とする請求項4記載のヒンジ装置。

【請求項6】 前記回転部の先端側に前記挟持バネ体が支承弾性部に抗して離反移動することをガイドするガイド部を連設し、前記回転付勢機構により前記回転部が前記挟持バネ体に対して自動的に相対回転する途中の回転位置では、前記ガイド部を挟持する位置に離反した前記挟持バネ体は、この挟持バネ体と前記回転部とが被嵌する係合位置に戻り動できず、回転付勢機構による自動相対回転を終了した回転位置若しくは終了することとなる所定回転位置で、挟持バネ体は前記支承弾性部の復帰力により自動的に前記係合位置に戻り動し前記自動相対回転が終了する形状に前記ガイド部を設定したことを特徴とする請求項1～5のいずれか1項に記載のヒンジ装置。

【請求項7】 前記回転部若しくは回転部の先端部に連設した挟持バネ体の離反移動をガイドするガイド体に、前記回転付勢機構による前記回転部の前記挟持バネ体に対する自動相対回転が終了する回転位置を保持する係合部に係合する保持係合部を設けたことを特徴とする請求項1～6のいずれか1項に記載のヒンジ装置。

【請求項8】 前記ロック解除操作部は、押動操作部とこの押動操作部によって前記挟持バネ体を支承弾性部に抗して前記回転部から押動離反させる作動杆部とから構成したことを特徴とする請求項1～7のいずれか1項に

記載のヒンジ装置。

【請求項9】 前記請求項1～8のいずれか1項に記載したヒンジ装置を枢着部に設けたことを特徴とするヒンジ装置を用いた電子機器。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、第一部材、第二部材とを枢着するヒンジ装置、例えば前記第一部材と第二部材との基端部同志を枢着して、双方が重合した閉塞状態から第一部材、第二部材のいずれか一方が所定開放角度まで回動した開放状態に開閉できるヒンジ装置、並びにヒンジ装置を用いた例えば携帯式電話やノート形パソコンなどの電子機器に関するものである。

【0002】

【従来の技術及び発明が解決しようとする課題】例えば、携帯式電子機器の典型例としての携帯式電話においては、携帯式電話機本体にフリップが開閉自在に取り付けられたフリップタイプと、フリップなしの一体タイプとが知られている。一体タイプは、軽量化と利便性の点で秀れているが、スイッチの誤動作防止、コンパクト化、デザインの多様性などの点においてフリップタイプは秀れている。

【0003】このようなフリップを備えたタイプの携帯式電子機器においては、フリップの開閉をワンタッチ式に簡易に行うことが要望されている。

【0004】しかしながら、従来のヒンジ装置を、携帯式電話機本体に対してのフリップの連結に応用した場合、フリップの回動ロック機構やロックを解除するためのボタンなどの駆動機構を、ヒンジ装置とは別途に必要としていたため、部品点数が多くなり、またそのためのスペースを設ける必要がある等の問題が生じていた。

【0005】そこで、本出願人は国際公開されたWO 00/50780公報に示すように、ワンタッチで開閉できる構成でありながら、開閉ロックのための別途の機構を機器側に設けることを不要とし、携帯式電子機器の構成の単純化、省スペース化に寄与し得るヒンジ装置を開発した。

【0006】この装置では、例えば前述のようにフリップタイプの携帯式電話に適用した場合、このヒンジ装置に設けたロック解除操作部（押込ボタン）を指で押すだけで、閉塞付勢されているフリップが自動的に一挙に開放回動する構成としている。

【0007】この自動開閉機能を果たすヒンジ装置は、閉塞付勢機能を果たしながらも、ワンタッチで自動開閉する構造を実現する画期的なヒンジ装置であるが、この一挙に自動開放させるための回動付勢機構は強力な付勢力を生じるものとしなければならない。

【0008】例えば、フリップが重量のあるものであった場合、これを開放するに十分なトルクを必要とするし、またフリップは比較的軽量に設計できても、ノート

形パソコンなどのLCD側となる開閉蓋などを自動回動させる場合には、かなり強力なトルクを必要とする。

【0009】即ち、例えばこの回動付勢機構として開放位置から閉塞位置とすることで振れ力が蓄えられるトルクバネを採用し、このトルクバネによる自動回動付勢力に打ち勝つ閉塞付勢機構としてはカム係合構造を採用し、このカム係合によって前記回動付勢を阻止し、解除操作部（押ボタン）を押すことで、係合状態のカム係合を離反させてこのカム係合解除によって、カム係合の一方を前記回動付勢機構によって自動的に回動させる構成とすることで実現できるが、前述のように強力なトルクバネで回動付勢する場合、即ち重量のあるフリップや開閉蓋などを押ボタンで一挙に自動回動させることができるように強力なトルクバネを用いる場合には、これに抗する閉塞付勢機構を機能させるため、言い換えれば押ボタンをまだ押さないときには閉塞状態を保持させるために、強力なカム係合としてこの強い回動トルクを阻止していなければならない。即ち、カム係合が勝手に回動付勢機構によって係脱しないように、押ボタンにより離反移動させるカム係合の一方のカム部を強力な支承バネで押圧してカム係合を確固に保持させておく必要がある。

【0010】しかし、この支承バネを強力なものにする、この支承バネはカム部の離反移動の抵抗となるわけであるから、押ボタンをかなり強く押し込まなければならなくなってしまう。

【0011】即ち、これまでのカム係合による閉じ付勢で自動回動を阻止し、押ボタンによりカム係合を離反させて係脱させ、これにより自動的に開放回動させるワンタッチ式の回動開閉構造では、回動付勢機構の回動付勢力（自動回動のための回動トルク）が大きければ大きいほど押ボタンによる解除操作に強い力が必要になってしまいう構造上の問題がある。

【0012】本発明は、更に研究を進め、このような問題点をも解決したもので、ワンタッチ開閉操作部であるロック解除操作部を押込操作して自動開放させる自動開閉機能を備える場合、たとえ重量のある開閉部材を自動回動させるために強い回動付勢力を有する構成とし、且つこれを阻止する閉塞付勢機能を備えた構成としても、弱い操作力で、回り止めしていた閉塞付勢を解除操作できる（即ち、弱い操作力で自動開放回動できる）画期的なヒンジ装置並びにヒンジ装置を用いた電子機器を提供することを目的としている。

【0013】

【課題を解決するための手段】添付図面を参照して本発明の要旨を説明する。

【0014】第一部材1、第二部材2とを枢着するヒンジ装置であって、この第一部材1、第二部材2のいずれか一方に固定状態に設けられ、この第一部材1、第二部材2のいずれか一方の回動に伴って回動する回動部3に、挟持付勢し抗抵弾性を有する挟持バネ体4を被嵌配

設し、前記回動部3の外形状を回動位置によって径寸法が異なる所定のカム形状に設定して、前記挟持バネ体4による挟持押圧により前記回動部3を前記挟持バネ体4に対して相対回動させるカム回動付勢力が生じるように構成し、前記回動部3を前記挟持バネ体4に対して前記カム回動付勢とは逆回転方向に相対回動付勢する回動付勢機構5を設け、前記回動付勢機構5による相対回動付勢力よりも前記挟持バネ体4によるカム回動付勢力の方が大きくなるように設定して、前記回動部3に前記挟持バネ体4が被嵌し前記カム回動付勢力が生じ得る状態においては、前記回動付勢機構5による相対回動付勢によって自動的に相対回動しないように構成し、前記挟持バネ体4を前記回動部3に対して相対的に離反移動自在に構成し、この前記挟持バネ体4を前記回動部3から相対的に離反移動させるロック解除操作部7を設け、この

ロック解除操作部7の操作により前記挟持バネ体4を前記回動部3から前記カム回動付勢力が生じ得ない位置まで離反させることで、前記回動付勢機構5により前記回動部3が自動的に前記挟持バネ体4に対して相対回動するように構成したことを特徴とするヒンジ装置に係るものである。

【0015】また、第一部材1と第二部材2との基端部同志を枢着して、双方が重合した閉塞状態から第一部材1、第二部材2のいずれか一方が所定開放角度まで回動した開放状態に開閉できるヒンジ装置であって、前記第一部材1、第二部材2のいずれか一方に固定状態に設けられ、この第一部材1、第二部材2のいずれか一方の回動に伴って回動する回動部3と、前記第一部材1、第二部材2のいずれか他方に固定状態に設けられ、この第一部材1、第二部材2のいずれか他方の回動に伴って回動する挟持バネ体4とを設け、前記回動部3を挟持付勢により押圧し抗撓弾性を有する前記挟持バネ体4をこの回動部3に被嵌配設し、前記回動部3の外形状を回動位置によって径寸法が異なる所定のカム形状に設定して、前記挟持バネ体4による挟持押圧により前記回動部3を前記挟持バネ体4に対して相対回動させて閉塞状態へ閉じ付勢するカム回動付勢力が生じるように構成し、前記回動部3を前記挟持バネ体4に対して前記カム回動付勢とは逆回転方向に相対回動付勢する回動付勢機構5を設け、前記回動付勢機構5による開放状態への開き付勢となる相対回動付勢力よりも前記挟持バネ体4による閉じ付勢となるカム回動付勢力の方が大きくなるように設定して、前記回動部3に前記挟持バネ体4が被嵌しこの挟持バネ体4により前記閉じ付勢となるカム回動付勢力が生じる状態においては、前記回動付勢機構5による開き付勢となる相対回動付勢力によっては自動的に相対回動せず、閉塞状態が保持されるように構成し、前記挟持バネ体4を前記回動部3に対して相対的に離反移動自在に構成し、前記挟持バネ体4を前記回動部3から相対的に離反移動させるロック解除操作部7を設け、このロック

解除操作部7の操作により前記挟持バネ体4を前記回動部3から前記カム回動付勢力が生じ得ない位置まで離反させることで、前記回動付勢機構5により前記回動部3が前記挟持バネ体4に対して開放状態とする方向へ自動的に相対回動するように構成したことを特徴とする請求項1記載のヒンジ装置に係るものである。

【0016】また、前記挟持バネ体4は、前記回動部3を挟持付勢により押圧する一対の対向部を有する抱持形バネにより構成したことを特徴とする請求項1、2のいずれか1項に記載のヒンジ装置に係るものである。

【0017】また、前記挟持バネ体4は、挟持する前記回動部3を押圧する一対の対向板部を有する抱持形板バネにより構成し、この対向板部の挟持押圧により回動部3の外径寸法が小さくなる回動姿勢に回動せしめる前記カム回動付勢力が生じるように構成又は回動部3の一部にカム形状部としてカム回動力を生じるR面若しくは傾斜面を形成し、このカム形状部を挟持押圧することで、前記カム回動付勢力が生じるように構成したことを特徴とする請求項3記載のヒンジ装置に係るものである。

【0018】また、前記挟持バネ体4は、挟持する前記回動部3を押圧する一対の対向板部を有する抱持形板バネを複数枚重合した構成として、前記回動付勢機構5による相対回動付勢力より勝る挟持付勢による前記カム回動付勢力が生じ得るように構成したことを特徴とする請求項4記載のヒンジ装置に係るものである。

【0019】また、前記回動部3の先端側に前記挟持バネ体4が支承弾性部8に抗して離反移動することをガイドするガイド部9を連設し、前記回動付勢機構5により前記回動部3が前記挟持バネ体4に対して自動的に相対回動する途中の回動位置では、前記ガイド部9を挟持する位置に離反した前記挟持バネ体4は、この挟持バネ体4と前記回動部3とが被嵌する係合位置に戻り動できず、回動付勢機構5による自動相対回動を終了した回動位置若しくは終了することとなる所定回動位置で、挟持バネ体4は前記支承弾性部8の復帰力により自動的に前記係合位置に戻り動し前記自動相対回動が終了する形状に前記ガイド部9を設定したことを特徴とする請求項1～5のいずれか1項に記載のヒンジ装置に係るものである。

【0020】また、前記回動部3若しくは回動部3の先端部に連設した挟持バネ体4の離反移動をガイドするガイド部9に、前記回動付勢機構5による前記回動部3の前記挟持バネ体4に対する自動相対回動が終了する回動位置を保持する係合部10に係合する保持係合部11を設けたことを特徴とする請求項1～6のいずれか1項に記載のヒンジ装置に係るものである。

【0021】また、前記ロック解除操作部7は、押動操作部7Aとこの押動操作部7Aによって前記挟持バネ体4を支承弾性部8に抗して前記回動部3から押動離反させる作動杆部7Bとから構成したことを特徴とする請求

項1～7のいずれか1項に記載のヒンジ装置に係るものである。

【0022】また、前記請求項1～8のいずれか1項に記載したヒンジ装置を枢着部に設けたことを特徴とするヒンジ装置を用いた電子機器に係るものである。

【0023】

【発明の実施の形態】好適と考える本発明の実施の形態（発明をどのように実施するか）を、図面に基づいてその作用効果を示して簡単に説明する。

【0024】回動付勢機構5により例えば回動部3に対して挟持バネ体4が回動付勢されている場合、回動部3と挟持バネ体4とが被嵌係合している状態では所定カム形状の回動部3を挟持バネ体4が挟持押圧することで回り止めされ、この回動付勢機構5によっては回動部3に対して挟持バネ体4は自動回動しない。

【0025】また、一方ロック解除操作部7を操作して例えば回動部3に対して挟持バネ体4を離反させ、前記挟持バネ体4の挟持押圧による回り止め状態を解除すると、前記回動付勢機構5により回動部3に対して挟持バネ体4が自動的に回動する。即ち、ロック解除操作部7を操作すると第一部材1、第二部材2のいずれか一方が他方に対して自動的に回動することとなる。

【0026】従って、ロック解除操作部7の操作により自動回動する機能を備えながら、回動部3と挟持バネ体4との被嵌係合によってこの自動回動を阻止し、且つ回動部3のカム形状によって逆回動方向にカム回動付勢力が生じるように構成でき、しかも、この回動付勢機構5による自動回動を阻止する回り止め力は、この回動部3のカム形状とこれを押圧する挟持バネ体4とによる前記カム回動付勢力により生じさせるため、回動付勢機構5の自動回動付勢力を強くした場合には、挟持バネ体4の挟持付勢を強くすれば良い構成となるから、回動部3と挟持バネ体4との被嵌係合を支承する支承弾性部8を備えたとしてもこの支承弾性部8を強くする必要はなく、この支承弾性部8に抗して回動部3から挟持バネ体4を離反させるロック解除操作部7の操作力は弱くて済む構成となる。

【0027】第一部材1と第二部材2との基端部同志を枢着して、双方が重合した閉塞状態から、例えば第一部材1に対して第二部材2を所定開放角度まで回動した開放状態に開閉できるヒンジ装置に本発明を適用し、例えば第一部材1に対して固定状態（回り止め状態）に回動部3を設け、開放回動する第二部材2に対して固定状態（回り止め状態）に挟持バネ体4を設け、この挟持バネ体4を回動付勢機構5により開放方向に回動付勢すると共に、この挟持バネ体4の回動付勢機構5による自動回動を阻止すべく、所定のカム形状とした回動部3にこの挟持バネ体4を被嵌し、この挟持バネ体4による挟持押圧によりあるいは回動部3の回動に対する挟持バネ体4の挟持押圧により前記回動付勢機構5の自動回動付勢

りも強いカム回動付勢力が生じるように構成すれば、この挟持バネ体4による閉じ方向へのカム回動付勢力で前記挟持バネ体4の自動回動が阻止される。

【0028】従って、例えば第一部材1と第二部材2とが重合した閉塞状態においては、回動部3と挟持バネ体4とが被嵌係合し、この挟持バネ体4によるカム回動付勢力により回り止め（開き止め）され、あるいは更に回動部3のカム形状と挟持バネ体4の挟持押圧の設定によっては、閉塞状態においてなおカム回動付勢力により閉じ付勢されることとなり、また、ロック解除操作部7を操作することで、回動部3から挟持バネ体4を離反させると、前記閉じ方向に働いていたカム回動付勢力は解除され、回動付勢機構5により挟持バネ体4が自動的に回動し、例えば自動的に一挙に第一部材1に対して第二部材2が開放回動し開放状態となる。

【0029】従って、例えばこの第二部材2の重量があるため、回動付勢機構5の回動付勢力を強いバネにより構成する場合は、これに抗する強いカム回動付勢力（回り止め保持力）が生じるように構成する必要があるが、この場合にはこれに抗する強いカム回動付勢力が生じるように強い挟持付勢（強い抗拡弾性）を有する挟持バネ体4を採用すれば良い。そのため、例えば回動部3と挟持バネ体4との被嵌係合を支承する支承弾性部8を設けたとしても、この支承弾性部8は、回動付勢力の強度に応じて強いバネとする必要はなく、従って、ロック解除操作部7の挟持バネ体4を押動して挟持バネ体4を離反させる押動操作力は弱くて良いこととなる。

【0030】

【実施例】本発明の具体的な実施例について図面に基づいて説明する。

【0031】本実施例では、第一部材1と第二部材2との基端部同志を枢着して、双方が重合した閉塞状態から第一部材1に対して第二部材2を所定開放角度まで開放状態に開閉できる電子機器のヒンジ装置に本発明を適用したもので、以下説明する。

【0032】第一部材1（本実施例では本体部）に固定状態に回動部3を設けて、第一部材1を回動すればこれに伴って回動部3は回動するように構成する。

【0033】第一部材1は本体部としているため、本実施例のこの回動部3はヒンジ装置の固定軸とも言える部分である。尚、逆に第一部材1を回動する場合には回転軸となる。

【0034】また、第二部材2（本実施例では、開閉部材）に固定状態（回り止め状態）に挟持バネ体4を設けて、第一部材1に対して第二部材2を開放回動させるとこの第二部材2の回動に伴って前記回動部3に対して挟持バネ体4が回動するように構成する。

【0035】即ち、回動部3は、取付部12を介して第一部材1に連結され、ヒンジ装置のケース13内の軸方向に突出状態に設けられ、第一部材1と一体となっている。

【0036】また、挟持バネ体4は、取付部14を介して第二部材2に回り止め連結される前記ケース13内に配設され、このケース13に対して支承弾性部8と共に回り止め状態に設けられ、第二部材2の回転に伴ってケース13毎回転するように設けられていると共に、このケース13内において軸方向に弾性支承部8に抗してスライド移動自在に構成されている。

【0037】更に説明すると、挟持バネ体4は回転部3に被嵌状態に配設され、弾性支承部8に抗して回転部3から離反スライド移動自在に構成している。尚、本実施例の弾性支承部8は挟持バネ体4が離反して押し締められる際には偏平状となる渦巻き形のバネを採用し、省スペース化を図っている。

【0038】また、本実施例では、第二部材2を開放状態に自動回転させるための回転付勢機構5を設けている。

【0039】即ち、本実施例では、第二部材2を開放状態から閉塞状態とすることでねじれ力が蓄えられ、開き方向に自動回転付勢力が生じるトルクバネ5をケース13に設けて、挟持バネ体4が回転部3に対して開き方向に

回転付勢されるように構成している。

【0040】また、回転部3の外形状は所定のカム形状とし、前記挟持バネ体4は、挟持付勢し抗撓弾性を有する抱持形バネとし、この挟持バネ体4を回転部3に被嵌して挟持押圧することで、閉じ方向にカム回転付勢力が生じるように構成している。

【0041】即ち、回転部3が開き方向に自動回転しようとすることを、この抗撓弾性を有する挟持バネ体4で挟持押圧することで閉じ方向に生じるカム回転付勢力で阻止し（回転部3と挟持バネ体4との被嵌係合により阻止し）、前記回転付勢機構5による自動回転を阻止するように構成している。

【0042】また、挟持バネ体4を回転部3に対して離反移動自在に構成し、挟持バネ体4を回転部3から離反移動させるロック解除操作部7を設け、このロック解除操作部7の操作により挟持バネ体4を前記支承弾性部8に抗して回転部3から前記カム回転付勢力が生じ得ない位置まで離反させることで、前記回転付勢機構5により挟持バネ体4が自動的に回転して開放状態となるように構成している。

【0043】また、本実施例では、このロック解除操作部7は、押ボタンとなる押動操作部7Aとこの押動操作部7Aによって挟持バネ体4を支承弾性部8に抗して前記回転部3から押動離反させる作動杆部7Bとから構成している。

【0044】この押動操作部7Aはケース13の一側部から外側に突出した構成とし、作動杆部7Bは前記回転部3内を貫通し、挟持バネ体4の内側の作動杆連結部15に連結され、挟持バネ体4を押動操作部7A（押ボタン）の押込み操作によって回転部3から離反させるように構

成している。

【0045】つまり、所定のカム形状とした回転部3にこの挟持バネ体4を被嵌し、この挟持バネ体4による挟持押圧によりあるいは回転部3の回転に対する挟持バネ体4の挟持押圧により前記回転付勢機構5の自動回転付勢よりも強いカム回転付勢力が生じるように構成して、この挟持バネ体4による閉じ方向へのカム回転付勢力で前記挟持バネ体4の自動回転を阻止するように構成している。

【0046】従って、第一部材1と第二部材2とが重合した閉塞状態においては、回転部3と挟持バネ体4とが被嵌係合し、この挟持バネ体4の挟持押圧により挟持バネ体4が回転しようとすることで生じるカム回転付勢力によって回り止め（開き止め）され、更に本実施例では回転部3のカム形状と挟持バネ体4の挟持押圧の設定、即ち、閉塞状態でもまだ少し回転部3が回転した姿勢となっていて、閉塞状態においてなおカム回転付勢力により閉じ付勢されるように構成し、閉塞状態においてガタ付きもなく、隙間なく閉じた状態を容易に実現できるように構成している。

【0047】そして、ロック解除操作部7を押し操作することで、回転部3から挟持バネ体4を離反させると、前記閉じ方向に働いていたカム回転付勢力は解除され、回転付勢機構5により挟持バネ体4が自動的に回転し、第一部材1に対して第二部材2が自動的に開放回転し開放状態となるように構成している。

【0048】従って、例えばこの第二部材2の重量があるため、回転付勢機構5の回転付勢力を強いバネにより構成する（例えばトルクバネ5の巻数を増やす）場合は、これに抗する強いカム回転付勢力（回り止め保持力）が生じるように構成する必要があるが、この場合にはこれに抗する強いカム回転付勢力が生じるように強い挟持付勢（強い抗撓弾性）を有する挟持バネ体4を採用すれば良いため、回転部3と挟持バネ体4との被嵌係合を支承する支承弾性部8は、回転付勢力の強度に応じて強いバネとする必要はなく、従って、ロック解除操作部7の挟持バネ体4を押動して挟持バネ体4を離反させる押動操作力は弱くて良いこととなる。

【0049】また、本実施例では、挟持バネ体4を前記回転部3を挟持押圧する一対の対向板部を有する抱持形板バネにより構成し、この対向板部の挟持押圧により回転部3の外径寸法が小さくなる回転姿勢に回転部3を回転せしめる前記カム回転付勢力が生じるように構成している。

【0050】従って、回転部3の径寸法が小さくなった回転姿勢を挟持バネ体4が被嵌係合している状態、即ち、回転部3の短径部の両側を挟持している状態を閉塞状態とすることで、この挟持バネ体4の被嵌係合により回転部3が開く方向に回転しようとするれば、短径部より長い部分を挟持することになるため挟持バネ体4を押し

広げようとする力が働くが、挟持バネ体4の抗撓弾性によって戻り方向（閉じ方向）にこれより強い力で閉じ付勢（カム回動付勢力）が生じ、よって回動付勢機構5による自動回動が阻止され、閉塞状態が保持されることとなる。

【0051】また、ロック解除操作部7を押し操作せず回動部3と挟持バネ体4とが被嵌係合したままの状態
で、手で回動付勢機構5にかかわらず第二部材2を開放
方向に回動する際には、この挟持バネ体4による挟持押
10 圧により閉じ方向へのカム回動付勢力（閉じ付勢）が生
じ、手を離せば自動的にこの閉じ付勢により閉塞状態に
戻る。また所定角度回動することで閉じ付勢が減じるよ
うにカム形状を設定すれば、これが回動抵抗となって手
を離れた位置に止まるフリーストップ状態が容易に実現
できる。

【0052】また、言い換えれば、挟持バネ体4の挟持
付勢と回動部3のカム形状の設定により、閉じ付勢（カ
ム回動付勢力）を大きく設定すれば、前述のように手を
離すと再び閉塞状態に閉じ回動するように構成すること
もでき、また、手で所定開放角度以上回動すると、カム
20 回動付勢力が弱くなるかあるいはなくなり、回動付勢機
構5により手を離しても自動的に開放状態まで開放回動
するように構成することができる。

【0053】本実施例では、短径部と長径部とを有する
方形型のカム形状とし、略90度手で回動することで、
長径部を挟持する位置を越え、手をはなしても回動付勢
機構5により開放状態まで自動回動するように構成し、
略90度まで手で回動させなければ、長径部を越えない
ため、再び短径部の両側を挟持する姿勢の閉塞状態まで
カム回動付勢力によって戻り回動し、閉塞状態が保持さ
30 れるように構成している。

【0054】従って、本実施例では、略90度回動する
位置まで閉じ付勢が働くように構成している。

【0055】また、本実施例では、閉塞状態においても
短径部を挟持する姿勢よりやや傾いた姿勢で回動部3を
挟持バネ体4により挟持押圧する構成とし、閉塞状態に
おいてなお閉じ付勢（カム回動付勢力）が生じている
ように構成し、閉塞状態がガタ付かず、また閉塞時に第
一部材1と第二部材2との間に不必要な隙間等が生じな
いように簡単に設計できる構成としている。

【0056】また、回動部3の短径部を挟持する姿勢に
おいて、辺縁部を凹設して隅角部を挟持バネ体4で挟持
押圧する構成とし、開放状態、閉塞状態でのガタ付きを
少なくしている。

【0057】また、挟持バネ体4は、回動部3を押圧す
る一対の対向板部を有する抱持形板バネを複数枚重合し
た構成として、前記回動付勢機構5による回動付勢力より
勝る挟持付勢による前記カム回動付勢力が簡易に得ら
れるように構成している。

【0058】また、回動部3の先端側に前記挟持バネ体

4が支承弾性部8に抗して離反移動することをガイドす
る筒状のガイド部9を連設し、前記回動付勢機構5によ
り挟持バネ体4が自動的に回動する途中の回動位置で
は、前記ガイド部9を挟持する位置に離反した前記挟持
バネ体4は、ガイド部9より回動部3の外径が大きい
（ガイド部9より回動部3が径大の）ために、挟持バネ
体4と回動部3とが被嵌する係合位置に戻り動できず、
回動付勢機構5による自動回動を終了することとなる回
動位置では、ガイド部9の外径と回動部3の外径とは略
一致し、挟持バネ体4は前記支承弾性部8の復帰力によ
り自動的に前記係合位置に戻り動し前記自動回動が終了
する形状に前記ガイド部9を設定している。

【0059】即ち、ガイド部9の外径を回動部3の短径
部とほぼ一致する構成とすることで、閉塞状態では短径
部の両側を挟持バネ体4が挟持している状態であるた
め、ロック解除操作部7の操作によって、この回動部3
からガイド部9へと弱い戻りバネの支承弾性部8に抗し
てスムーズに離反移動し、回動付勢機構5により挟持バ
ネ体4が自動回動を始めると、支承弾性部8の復帰力が
40 働いていても、回動部3がガイド部9より径大のため戻
り動せず、略180度回動して再び短径部の位置になる
とロック解除操作部7を押し続けていない限り、自動的
に支承弾性部8の復帰力によりガイド部9をガイドとし
て回動部3へ戻り動して回動部3に挟持バネ体4が被嵌
し、再び回り止め保持するように構成している。

【0060】また、本実施例ではこのガイド部9の先端
部に、図6、図7に示すように前記回動付勢機構5によ
る回動部3の前記挟持バネ体4に対する自動回動が終了
する回動位置を保持する係合部10に係合する保持係合部
30 11を設けた構成としている。

【0061】この係合部10は前記作動杆連結部15に設
け、ロック解除操作部7を押し操作しない状態では、閉
塞状態・開放状態に位置するときに係合していて、第二
部材2を挟持バネ体4の閉じ付勢に抗して手で回動すれ
ばこの係合は乗り上がり係脱し、また、ロック解除操作
部7を押し操作すれば、挟持バネ体4と共に作動杆連結
部15も離反することで離反係脱するように構成してい
る。

【0062】また、本実施例では、前述のように回動部
3を単に長方形とし、短径方向を挟持する姿勢から略
180度回動して再び短径方向を挟持する姿勢へと回動
する構成としたが、これでは前述のように長径部を挟持
する姿勢を越える略90度回転するまでは閉じ姿勢され
ていることとなるが、例えば図8に示すように回動部3
の外形を挟持バネ体4に対して少し相対回動させれば
挟持バネ体4の挟持押圧によって逆に回動付勢機構5の
開放方向への自動回動付勢と同じ向きのカム回動付勢
が生じ、少し手で第二部材2を解放回動させるだけで、
後は手を離しても回動付勢機構5を助長する同方向のカ
ム回動付勢によって自動開放回動するように構成して

も良いし、また図9～図11に示すように構成して少し回動するだけでカム回動付勢力が解除され、挟持バネ体4による挟持押圧による摩擦だけが回動抵抗となり、回動付勢機構5の回動付勢力を大きく設定すれば、ロック解除操作部7を押し操作しなくても手で第二部材2を少し回動するだけ一挙に自動的に開放回動する構成を実現できる。

【0063】即ち、閉塞状態、開放状態のときに係合するカム係合部16を回動部3と挟持バネ体4とに形成し、この回動部3と挟持バネ体4とのこのカム係合が外れよう10とするとカム回動付勢力が生じるように構成している。即ち、例えば図9に示すように回動部3の外周にカム凹部16Aを形成し、このカム凹部16Aに係合するカム凸部16Bを挟持バネ体4に折曲形成し、あるいは図10に示すように回動部3にカム凸部16Bを形成し、このカム凸部16Bに係合するカム凹部16Aを例えば挟持バネ体4を切欠した溝孔として形成し、このカム凹凸によるカム係合によって閉塞状態、開放状態の保持が可能となり、このカム係合を外れようとする、係合しようとする戻り力が生じ、この戻りカム力を前記カム回動付勢力として生じさせるものである。20

【0064】従って、閉塞状態あるいはこれに近い回動位置においては、このカム凹部16Aにカム凸部16Bが落ち込もうとする力がカム回動付勢力（閉じ付勢力）として働くが、このカム凹部16Aの傾斜面を急激にすることができ、この場合は、閉じ付勢が働く回動範囲は狭いが、大きな閉じ付勢を生じるように構成することが容易となる。

【0065】また、フリーストップ状態を広範囲に設定可能となるし、また、前述のように少しだけ開放回動させることで自動開放回動させることも容易に設計可能である。30

【0066】また、図11に示すように挟持バネ体4をU字状線材で構成し、この線材自体を前記カム凸部16Bとし、この線材に係合するカム凹部16Aを回動部3の外周に形成しても、前述のように様々な仕様に設計可能となる。

【0067】尚、本発明は、本実施例に限られるものではなく、各構成要件の具体的構成は適宜設計し得るものである。

【0068】回動部3と挟持バネ体4の作動は相対的な関係があれば良く、回動する側をどちらかにするかによって具体的構成は変わるものである。

【0069】

【発明の効果】本発明は上述のように構成したから、ワンタッチ開閉操作部であるロック解除操作部を操作して自動開放させる自動開閉機能を備える場合、たとえ重量のある開閉部材を自動回動させるために強い回動付勢力を有する構成とし、且つこれを阻止する閉塞付勢機能を備えた構成としても、弱い操作力で、回り止めしていた

閉塞付勢を解除操作できる（即ち、弱い操作力で自動開放回動できる）画期的なヒンジ装置並びにヒンジ装置を用いた電子機器となる。

【0070】即ち、例えば自動回動させる第一部材あるいは第二部材の重量があるため、回動付勢機構の回動付勢力を強いバネにより構成する場合は、これに抗する強いカム回動付勢力（回り止め保持力）が生じるように構成する必要があるが、この場合にはこれに抗する強いカム回動付勢力が生じるように強い挟持付勢（強い抗拉弾性）を有する挟持バネ体を採用すれば良い構成となるから、例えば回動部と挟持バネ体との被嵌係合を支承する支承弾性部を設けたとしても、この支承弾性部は、回動付勢力の強度に応じて強いバネとする必要はなく、従って、ロック解除操作部の挟持バネ体を押動して挟持バネ体を離反させる押動操作力は弱くて良いこととなり、操作性に秀れるなど極めて実用性に秀れたヒンジ装置並びにヒンジ装置を用いた電子機器となる。

【0071】また、請求項2記載の発明においては、本発明の作用・効果が一層良好に発明される極めて秀れたヒンジ装置となる。

【0072】また、請求項3、4、5記載の発明においては、一層容易に本発明を実現できることとなる極めて実用性に秀れたヒンジ装置となる。

【0073】また、請求項6記載の発明においては、挟持バネの離反移動がスムーズとなり、確実に前記作用・効果が発揮され、しかも自動的に閉塞状態と開放状態においては挟持バネが回動部に被嵌する位置に戻り動かせることも容易に設計可能となり、一層操作性に秀れた画期的なヒンジ装置となる。

【0074】また、請求項7記載の発明においては、開放状態が保持され一層実用性に秀れるヒンジ装置となる。

【0075】また、請求項9記載の発明においては、前記作用・効果を発揮する秀れたヒンジ装置を用いた電子機器となる。

【図面の簡単な説明】

【図1】本実施例の説明斜視図である。

【図2】本実施例の閉塞状態での説明断面図である。

【図3】本実施例のロック解除操作部を押動して自動開放回動途中での説明断面図である。40

【図4】本実施例の分解説明斜視図である。

【図5】本実施例の閉塞状態、回動途中、開放状態での回動部と挟持バネ体との関係を示す説明図である。

【図6】本実施例の回動部のガイド部に設けた保持係合部と、作動杆連結部に設けた係合部との係合を示す説明分解斜視図である。

【図7】本実施例の回動部のガイド部に設けた保持係合部と作動杆連結部に設けた係合部とが係合している閉塞状態、開放状態での係合状態の説明図と、回動途中で離反係脱している状態を示す説明図である。50

【図8】本実施例のロック解除操作部を押し操作せずに手で第二部材を回動する場合であって、回動部のカム形状の別例1を示すもので、閉塞状態、回動途中、開放状態での回動部と挟持バネ体との関係を示す説明図である。

【図9】本実施例の回動部（挟持バネ体）のカム形状の別例2を示す説明図である。

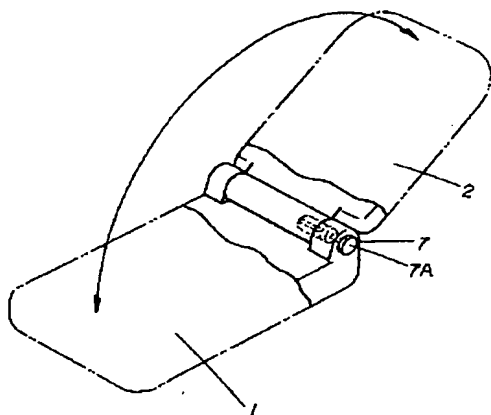
【図10】本実施例の回動部（挟持バネ体）のカム形状の別例3を示す説明図である。

【図11】本実施例の回動部（挟持バネ体）のカム形状の別例4を示す説明図である。

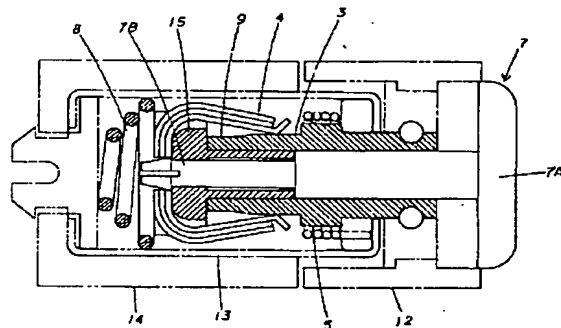
【符号の説明】

- * 1 第一部材
- 2 第二部材
- 3 回動部
- 4 挟持バネ体
- 5 回動付勢機構
- 7 ロック解除操作部
- 7A 押動操作部
- 7B 作動杆部
- 8 支承弾性部
- 9 ガイド部
- 10 係合部
- * 11 保持係合部

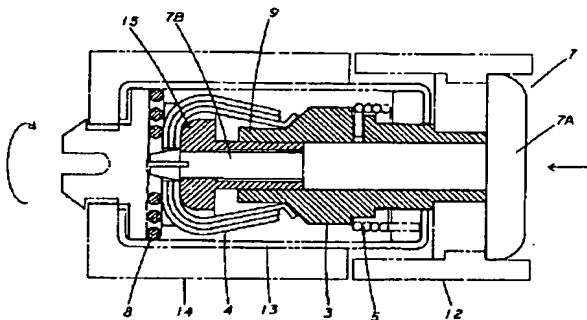
【図1】



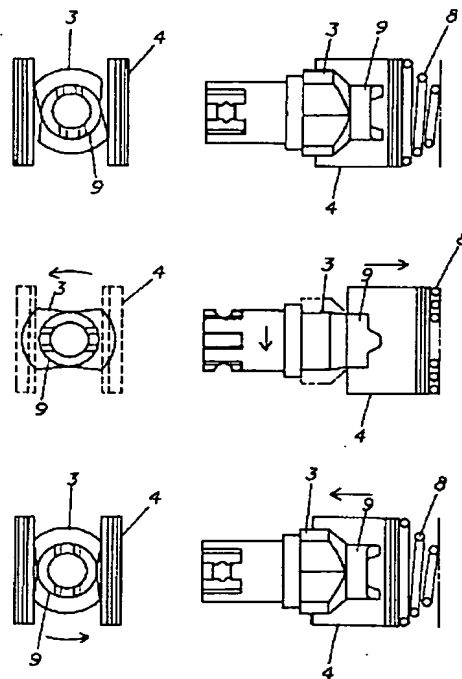
【図2】



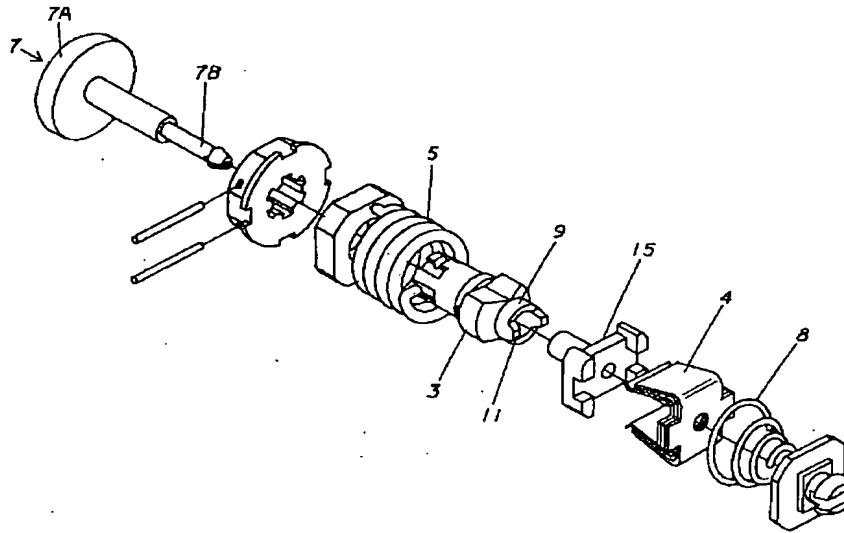
【図3】



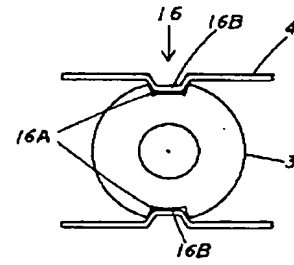
【図5】



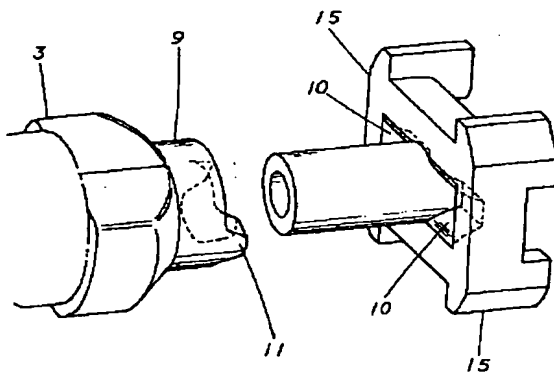
【図4】



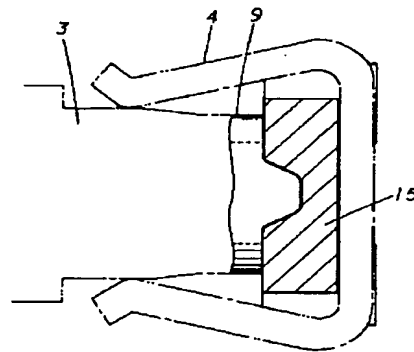
【図9】



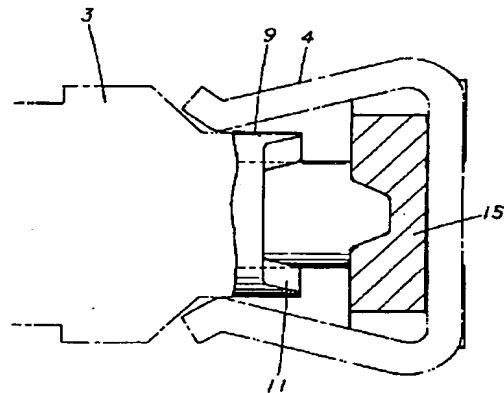
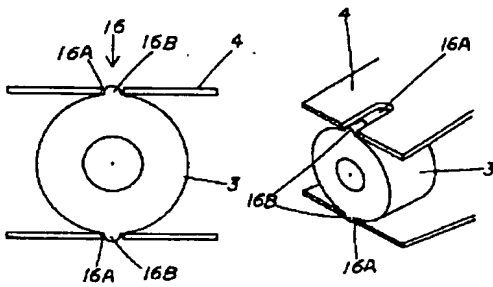
【図6】



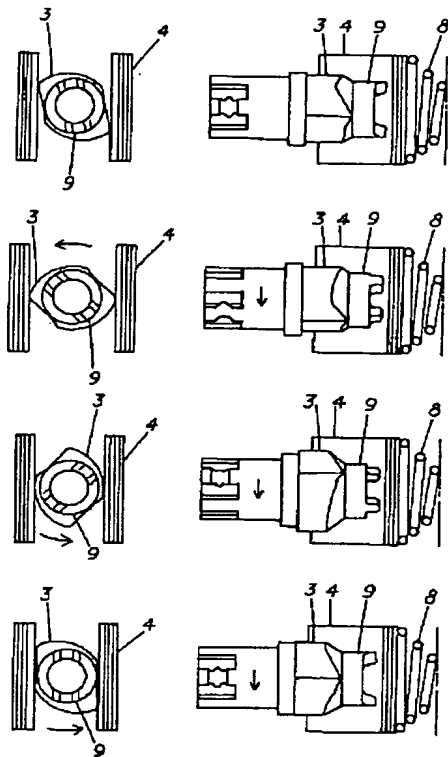
【図7】



【図10】



【図8】



【図11】

